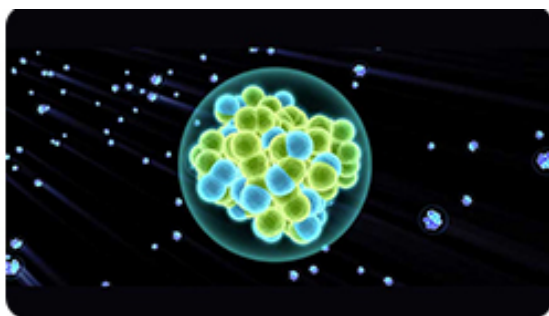


## LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory May 5-9, 2014.



### THERE'S A NEW KID IN TOWN



**Element 117, first discovered by Lawrence Livermore researchers and Russian collaborators, has been reproduced by an international consortium.**

There may soon be an official new kid on the block of the periodic table.

Scientists say they've succeeded in creating an element with the atomic number 117. This is the second time the element has been observed in a lab, making it increasingly likely that the unnamed element will be officially recognized. Element 117 was first discovered by Lawrence Livermore scientists and Russian collaborators.

To create elements in a lab, scientists smash nuclei together with the hopes that they will fuse, and remain relatively stable. Nuclei rarely fuse together, but sometimes when they do, a new element is created. These unstable elements tend to last mere nanoseconds.

To read more, to go [Good Morning America](#).



### A CATALYST FOR BIG DATA



**The Catalyst supercomputer at Lawrence Livermore employs a Cray CS300 architecture modified specifically for data-intensive computing.**

Catalyst, a first-of-a-kind supercomputer at Lawrence Livermore, is available to industry collaborators to test big data technologies, architectures and applications.

Developed by a partnership of Cray, Intel and Lawrence Livermore, this Cray CS300 high performance computing (HPC) cluster is available for collaborative projects with industry through Livermore's High Performance Computing Innovation Center (HPCIC).

The Catalyst architecture already has begun to provide insights into the kind of technologies the Advanced Simulation Computing program will require over the next decade to meet high performance simulation and big data computing needs. The increased storage capacity of the system (in both volatile and nonvolatile memory) represents the major departure from classic simulation-based computing architectures common at DOE laboratories and opens new opportunities for exploring the potential of combining floating point focused capability with data analysis in one environment.

To read more, go to [HPC Wire](#).



**IT'S ALL IN THE WRIST**



**Nymi uses a person's cardiac rhythm to authenticate them.**

Nearly everyone today has to remember a password to access a device, database or even a financial institution. And in any given day, you may forget one of those passwords. Experts agree that the only reliable way to secure a password is to memorize it so there is no record.

But there may be another way to identify you without remembering a string of passwords. The Nymi, developed by Bionym is a wristband that replaces conventional passwords with a reading of a person's electrocardiogram pattern.

Alan Kaplan, a research engineer at Lawrence Livermore, has published several studies examining ECG recognition. But even after extensive refinement of his analytic algorithm, Kaplan's research found a 6 percent to 7 percent rate of false negatives in matching the ECG patterns of individuals in different states, such as after exercise, or even just across a long time-span. "These error rates are what you have to live with," Kaplan says. However, "an ECG is very difficult to counterfeit."

To read more, go to [CNN](#).



**PROTECTING THE BORDERS**



**The Port of Oakland is one area where Lawrence Livermore devices could be used to detect illicit nuclear material.**

A critical aspect of protecting the country's borders is detecting the entry of illicit special nuclear materials, such as uranium and plutonium isotopes. To address concerns about potential smuggling or misuse of nuclear materials, efficient, compact and modular detectors could be used to scan air and ship cargoes, investigate suspicious items, monitor spent nuclear fuel, help guard border crossings and assist in ensuring compliance with arms control treaties.

A Lawrence Livermore research team led by electrical engineer Rebecca Nikolic has demonstrated a miniaturized, solid-state detection system that fulfills the need for a far more efficient and compact neutron detector than existing devices. The instrument, called a pillar detector, uses a detection element as thin as a credit card and manufactured primarily from silicon. Currently in advanced development, the device has demonstrated high efficiency without the many disadvantages of competing designs.

To read more, go to [Innovation](#).



**THERE'S GREEN LAND DOWN THERE**



**Former LLNL researcher Dylan Rood performs geology field work in eastern Greenland.**

At one point in history, Greenland was actually green and not a country covered in ice.

An international team of researchers, including former Lawrence Livermore scientist Dylan Rood, has discovered that ancient dirt in Greenland was cryogenically frozen for millions of years under nearly two miles of ice.

More than 2.5 million years ago. Greenland looked like the green Alaskan tundra, before it was covered by the second largest body of ice on Earth. Rood took dirt samples and analyzed them to determine that an ancient landscape is preserved underneath the Greenland Ice Sheet.

To read more, go to [Astrobiology Magazine](#).

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send [e-mail](#)